

# Oven Controlled Crystal Oscillator NI-10 MHz-2400 series

2400 Series in 36.3x27.2mm DIP package

NI-10M-2400 series oscillators is designed for applications where space is at a premium and good frequency stability is required. The oscillators can be used in many communications applications. A choice of quartz resonators offers a variety of performance versus cost options to fit most applications.



RoHS Compliant Standard

## ELECTRICAL SPECIFICATIONS

### 1. OUTPUT (PIN = "R.F. OUTPUT")

	Parameter	Min.	Typ.	Max.	Unit	Test Condition
1.1.	Frequency	10.000000			MHz	
1.2.	Initial Accuracy	-0.1		+0.1	ppm	@ +25 ±1°C after turn on power 15 ±1 minutes ≤ 90 days following date code VCO Input at Center Voltage ±0.001V
1.3.	Waveform	Rectangular				
1.4.	Level	CMOS				
	"1" level	+2.6	+3.3		V	
	"0" level			+0.4	V	
1.5.	Load		15		pF	
1.6.	Duty cycle	45	50	55	%	@ +1.65V
1.7.	Rise/fall time			6	ns	10% to 90%
1.8.	Spurious			-60	dBc	

### 2. FREQUENCY STABILITY

	Parameter	Min.	Typ.	Max.	Unit	Test Condition
2.1.	Ambient	±3, ±5, ±10			ppb	referenced to 25°C Refer to Table 1 : Ordering Information
		-30 ~ +70			°C	
		-40 ~ +85				
2.2.	Aging	-0.5		+0.5	ppb	per day, at time of shipment
	Daily	-0.5		+0.5	ppb	after 30 days
	Yearly	-50		+50	ppb	
	10 Years	-0.3		+0.3	ppm	
2.3.	Voltage	-0.5		+0.5	ppb	±5% change
2.4.	Short term			0.05	ppb/s	root Allan variance
2.5.	Load	-0.5		+0.5	ppb	±5% change
2.6.	Warm-up	-10		+10	ppb	in 10 minutes @ +25 ±1°C referenced to 1 hour

	Parameter	Min.	Typ.	Max.	Unit	Test Condition
2.7.	Phase Noise		-95	-90	dBc/Hz	@ 1Hz
			-125	-120	dBc/Hz	@ 10Hz
			-140	-135	dBc/Hz	@ 100Hz
			-148	-145	dBc/Hz	@ 1KHz
			-156	-155	dBc/Hz	@ 10KHz
			-158	-155	dBc/Hz	@ 100KHz

### 3. ELECTRICAL FREQUENCY ADJUSTMENT (PIN = "VCO INPUT")

	Parameter	Min.	Typ.	Max.	Unit	Test Condition
3.1.	Tuning Range			-0.5	ppm	VCO @ Min. Voltage
		+0.5			ppm	VCO @ Max. Voltage
3.2.	Control Voltage	0		+5.0	V	<b>Optional, Refer to Table 1 : Ordering Information</b>
		0		+4.0	V	
3.3.	Slope	Positive				
3.4.	Center Voltage		+2.5		V	<b>Optional, Refer to Table 1 : Ordering Information</b>
			+2.0		V	
3.5.	Linearity	-10		+10	%	
3.6.	Input Impedance	100			kΩ	

### 4. INPUT POWER (PIN = "+VDC")

	Parameter	Min.	Typ.	Max.	Unit	Test Condition
4.1.	Voltage	+4.75	+5.0	+5.25	V	
4.2.	Current			800	mA	@ turn on
4.3.	Steady State			1.3	W	@ +25°C

### 5. REFERENCE VOLTAGE (PIN = "REFERENCE VOLTAGE")

(Optional Function. Refer to Table 1 : Ordering Information.)

	Parameter	Min.	Typ.	Max.	Units	Test Condition
5.1.	Voltage	+3.8	+4	+4.2	V	Over temperature range in 2.1.
5.2.	Load	9			kΩ	

### 6. ENVIRONMENTAL

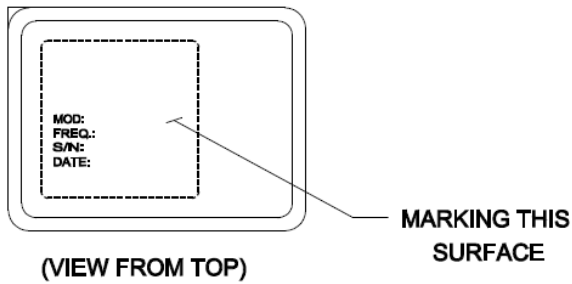
	Parameter	Reference Std.	Test Condition
6.1.	Operating Temperature	-40°C to +85°C	Note 2
6.2.	Storage Temperature	-55°C to +105°C	
6.3.	Humidity	MIL-STD-202, Method 103 Test Condition A	95% RH @ +40°C, non-condensing, 240 hours
6.4.	Vibration (non-operating)	MIL-STD-202, Method 201	0.06" Total p-p, 10 to 55 Hz
6.5.	Shock (non-operating)	MIL-STD-202, Method 213, Test Condition J	30g, 11ms, half-sine

**Note 1.** When not connected, VCO INPUT is internally held at this voltage.

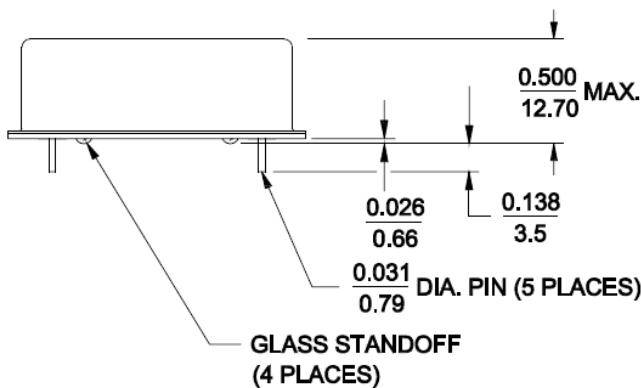
**Note 2.** Output maintained over this temperature range. Other requirements of this specification may not be met when operating outside the temperature range in 2.1.

**Table 1 : ORDERING INFORMATION**

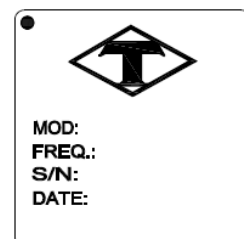
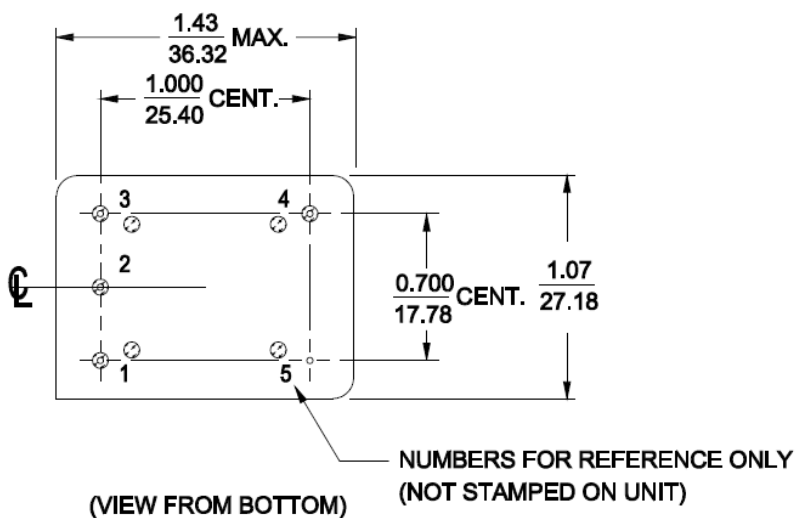
Temp. (°C)	TAITIEN Model No.	ppb	±3	±5	±10	Control Voltage	Reference Voltage
-30~+70			NI-10M-2400	NI-10M-2401	NI-10M-2402	+2.5V	N/A
-40~+85			NI-10M-2403	NI-10M-2404	NI-10M-2405		
-30~+70			NI-10M-2450	NI-10M-2451	NI-10M-2452	+2.0V	+4.0V
-40~+85			NI-10M-2453	NI-10M-2454	NI-10M-2455		

**OUTLINE DRAWING**


PIN CONNECTIONS	
PIN	FUNCTION
1	VCO INPUT
2 (See Note 1)	REFERENCE VOLTAGE or NOT CONNECTED
3	+VDC
4	R. F. OUTPUT
5	0 VOLTS & CASE


**Note:**

- For NI-10M-2400 THRU NI-10M-2405 NOT internally CONNECTED.



TOLERANCES:  
UNLESS OTHERWISE SPECIFIED:  
ANGLES: ±1 DEGREE  
FRACTIONS: ±1/32 INCH  
DECIMALS: .XX±.015, .XXX±.010 INCH  
INCH (REFERENCE ONLY)  
mm